

THE ECONOMIC IMPACT OF CIVIL AVIATION ON THE U.S. ECONOMY – 2000

Presented by

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Aviation is the nation's dominant intercity mode of transportation for those passengers and goods which must be transported quickly and efficiently. Air transportation has become so universal that no one questions aviation's importance as an essential form of transport.

Aviation employs many thousands of people, and thousands more work in aviation's support industries -- the steel worker whose steel is essential to the airport rental car and the aircraft, the hotel employees where an air passenger stayed, the printer of the airline's schedule, the farmer that grows vegetables for the in-flight meals and the grocer who sells food to the airport worker. All of these, and others, benefit economically from aviation regardless of whether they have ever flown.

Aviation's final "products" are passengers and cargo safely and efficiently delivered to their destination. Most people are familiar with the aviation elements that they see and use -- the airports, the airlines, and the aircraft. They also might be familiar with some of the support elements -- the baggage services, travel agents and others. However, the aviation industry is much more than that; it includes an intricate set of suppliers of a wide variety of goods and services, all of which economically benefit from aviation.

National Study of Aviation's Economic Impact

In 1988 and again in 1990, the Partnership for Improved Air Travel commissioned Wilbur Smith Associates to conduct independent studies of the aviation industry. In 1993 and 1995 Lockheed Martin asked Wilbur Smith Associates to update these earlier reports. The 1988 study utilized data for 1987; the 1990 update study used 1989 data; the 1993 study used 1991 data; and the 1995 study used data for 1993. Those studies used the same methodology to examine the total aviation industry, and to measure its economic importance to the U.S. economy in

terms of dollar value and jobs. The studies measured and documented the value of the financial transactions that are attributable, or associated with, civil aviation in the U.S.

2000 Economic Impact Study Update

Since those studies, growth has occurred in the demand and use of civil aviation. To recognize these increases, MCA Research and the Federal Aviation Administration asked Wilbur Smith Associates to again update the previous studies.

This document summarizes that update, and presents civil aviation's economic impact on the U.S. economy for the year 1998.

The Economic Impact Approach

This national aviation economic impact study utilizes conventional and accepted methods to quantify the economic value of financial transactions that are associated directly or indirectly with aviation. The study traces this flow of funds through the economy, and identifies which industry types benefit, and by how much.

National Approach to Economic Impact Assessment

Many states, regions and individual airport owners have conducted economic impact studies of specific airports. Such studies are useful because they demonstrate the economic value of specific airports to their communities. This Study complements those localized studies by applying a consistent methodology to all airports and aviation sectors, so that the results are directly comparable; by recognizing that the aviation industry is largely interstate in nature, conveying benefits to far more than a single state or community; and by being all-inclusive, in that it includes all 18,746 civil airports in the U.S., and every aviation participant.

The study uses the Federal Aviation Administration recommended procedures concerning how to identify and quantify the economic impact of airports, it uses U.S. Department of Transportation data bases regarding the nation's airports, and it is "input/output model-based," utilizing the "RIMS-II" Model of the U.S. Department of Commerce, Bureau of Economic Analysis.

Three Measures of Economic Impact

The economic impact of aviation, and of each sector of the aviation industry, is measured in this study in terms of three economic impact types:

- # Economic Activity (Output)
- # Earnings
- # Jobs

These indicators of impact value are defined in Exhibit 1. In each case, the impacts include the aviation sector itself, as well as the "multiplier effect" of the aviation sector. The impacts are estimated for the year 1998, the most recent year for which data are available. All three indicators of economic impact are used to explain aviation's economic impact; however,

they should not be added together. The estimated annual economic impacts for these impact indicators are listed on Exhibit 2. All dollar values presented in the following text and exhibits are in current 1998 dollars unless noted otherwise.

Exhibit 2 TOTAL 1998 IMPACT OF CIVIL AVIATION

<u>Aviation Type</u>	<u>Annual Economic Activity</u> (\$Billion)	<u>Annual Earnings</u> (\$Billion)	<u>Jobs</u> (Thousand)
Commercial:			
Provision	\$ 288.5	\$82.5	2,734
Use	518.1	145.0	6,692
Manufacturing	<u>104.6</u>	<u>31.0</u>	<u>832</u>
Subtotal	\$911.2	\$258.5	10,257
General:			
Provision	\$30.8	\$8.9	298
Use	11.4	4.4	163
Manufacturing	<u>22.3</u>	<u>6.6</u>	<u>177</u>
Subtotal	\$64.5	\$19.9	638
Total	\$975.7	\$278.4	10,895

Exhibit 1: THREE MEASURES OF ECONOMIC IMPACT VALUE

Impact Type #1 Economic Activity: \$976 billion

"Economic Activity" is the value of the aviation final demand (aircraft, aviation service), plus the sum of all of the intermediate goods and services needed to produce the aviation final demand, plus the induced impacts of increased household consumption.

Impact Type #2 Earnings: \$278 billion

"Earnings" are the sum of the wages and salaries to all employed persons that the aviation industry pays directly, indirectly or due to induced impacts, to deliver the output of final aviation demand. Earnings Impact are always included in the Economic Activity totals, so should not be summed with the Economic Activity Impact. Earnings are a conservative proxy for "value added," and may be greater or less than the direct or indirect value of the industry, depending on the industry type.

Impact Type #3 Jobs: 10.9 million

"Jobs" equal the number of employees who are employed in the aviation industry, plus the aviation-oriented share of those that are employed in sectors that support the air passenger (hotels, restaurants, etc.) plus those employed in the industries included in the induced impacts. The number of jobs attributable to an industry is always greater than simply those in the industry itself, due to the "responding" of money.

Economic Impact Types and Causes

The aviation industry economic impacts calculated in this study comprise those financial transactions that can be traced to aviation and which are of value to the nation's economy and its citizens. The impacts are real and quantifiable; hypothetical, imaginary or subjective impacts are not considered. The impacts are divided into three types, as shown on Exhibit 3, which can be added together:

- # Direct Impacts - Direct impacts are those financial transactions that occur due to the provision of air passenger and air cargo services, and the provision of aircraft. They typically occur at airports and aircraft manufacturing firms and include expenditures by

airlines, airport tenants, air cargo firms, fixed base operators (FBO's), ground transport firms, flight schools, airport concessions, aircraft manufacturing and others involved in the provision of aviation.

- # Indirect Impacts - Indirect impacts are those financial transactions that occur due to the use of aviation. They include expenditures by visitors who arrive by air, expenditures by travel agents, expenditures by business aviation and others. Indirect impacts typically (but not always) occur at off-airport locations.

- # Induced Impacts - Induced impacts are the "multiplier" implications associated with direct and indirect impacts.

Exhibit 3
AVIATION'S 1998 ECONOMIC ACTIVITY IMPACTS (\$Billions)

DIRECT ECONOMIC IMPACTS		INDIRECT ECONOMIC IMPACTS	
Airline Operations	\$84.1	Airline Passengers	\$179.6
Airport Operations	13.8	General Aviation Passengers	2.8
General Aviation	9.7	Travel Arrangements	5.8
Aircraft Manufacturing	<u>42.5</u>	Other General Aviation	<u>1.4</u>
Total Direct Impact	\$150.1	Total Indirect Impact	\$189.6

INDUCED ECONOMIC IMPACTS	
From Direct Impacts	\$296.0
From Indirect Impacts	<u>340.0</u>
Total Induced Impacts	\$636.0

TOTAL ANNUAL ECONOMIC IMPACTS	
Commercial Aviation	
Aviation Provision	\$288.5
Aviation Use	518.1
Aircraft Manufacturing	<u>104.6</u>
Total Commercial Impact	\$911.2
General Aviation	
Aviation Provision	\$30.8
Aviation Use	11.4
Aircraft Manufacturing	<u>22.3</u>
Total General Aviation Impact	<u>\$64.5</u>
Total Aviation Annual Impact	\$975.7

Civil Aviation's Economic Impact

This study confirms that virtually all activities involved in the provision and use of aviation are important to the nation's economy. As a general rule, the more extensive the aviation activity, e.g., the larger the airport, the larger the economic impact. However, even the smallest airports and the smallest aviation sectors contribute to our national economy.

Commercial aviation accounts for 93.4% of aviation's total economic impact. Although general aviation generates only 6.6% of aviation's total impact, general aviation is nonetheless very important, since it generates nearly 637,800 jobs and \$64 billion in economic activity. Within these totals, manufacturing of new aircraft represents 13% of aviation's total economic impact. All three elements -- commercial aviation, general aviation and new aircraft manufacturing -- are therefore crucial to the U.S. economy.

The economic impact of aviation, including its "multiplier" effect, are listed as follows.

- # Aviation-related economic activity totals \$975.7 billion annually.

- # Aviation related activity employs 10.9 million people who earn \$278.4 billion annually.
- # A third (33%) of aviation's impact is attributable to the provision of aviation (the airlines, airports, FBO's, etc.), over half (54%) is due to the use of aviation, and 13% is due to the manufacture of new aircraft.
- # The direct/indirect impacts of \$339.6 billion yield an additional \$636.0 billion annually in additional economic activity.
- # For each dollar delivered to final demand by the aviation industry an additional \$1.87 in output (economic activity) is generated, for an overall multiplier of 2.87.

In Exhibits 4 and 5, air cargo impacts are included in the airline and airport totals, and travel arrangement impacts refer to travel agencies. Aircraft manufacturing refers to the manufacture of new aircraft; aircraft repair and parts are included in the direct impacts of aviation provision.

Exhibit 4 CIVIL AVIATION 1998 ECONOMIC ACTIVITY IMPACT SUMMARY

	<u>Annual Impacts (\$ Million)^(a)</u>		
	<u>Commercial Aviation</u>	<u>General Aviation</u>	<u>Total Aviation</u>
Commercial Service Airports	\$806,570	\$20,339	\$826,909
General Aviation Airports	---	21,859	21,859
Total Airports and Air Use	\$806,570	\$42,198	\$848,768
Aircraft Manufacturing	104,640	22,258	126,898
Total Aviation	\$911,210	\$64,456	\$975,666

(a) Intermediate and final demand, includes "multiplier" effect.

Exhibit 5
SUMMARY - TOTAL 1998 ECONOMIC IMPACT OF CIVIL AVIATION^(a)
U.S. Economy

	Annual Economic Activity (\$Million)	Annual Earnings (\$Million)	<u>Jobs</u>
COMMERCIAL SERVICE AIRPORTS			
Direct Impacts:			
Commercial Aviation			
Certificated Airlines	\$243,066	\$69,023	2,278,758
Airports and Other	45,411	13,473	454,845
General Aviation	<u>12,921</u>	<u>3,756</u>	<u>125,215</u>
Total Direct	\$301,397	\$86,251	2,858,818
Indirect Impacts:			
Visitor Expenditures			
Air Carrier/Commuter	\$502,185	\$139,849	6,489,169
General Aviation	<u>5,608</u>	<u>1,562</u>	<u>72,469</u>
Total Visitor Expenditures	\$507,793	\$141,410	6,561,638
Travel Arrangements	15,908	5,156	202,822
Other General Aviation Indirect	<u>1,811</u>	<u>1,078</u>	<u>29,975</u>
Total Indirect	<u>525,512</u>	<u>147,644</u>	<u>6,794,435</u>
Total Commercial Service Airports	\$826,910	\$233,895	9,653,253
GENERAL AVIATION AIRPORTS			
Direct Impacts	\$17,840	\$5,176	172,929
Indirect Impacts			
Visitor Expenditures	2,130	578	28,350
Other Indirect	<u>1,889</u>	<u>1,179</u>	<u>31,900</u>
Total Indirect	<u>4,019</u>	<u>1,757</u>	<u>60,250</u>
Total General Aviation Airports	\$21,859	\$6,933	233,179
NEW AIRCRAFT MANUFACTURE			
Commercial Aircraft	\$104,640	\$30,971	831,743
General Aviation Aircraft	<u>22,258</u>	<u>6,587</u>	<u>176,920</u>
Total Aircraft Manufacturing	\$126,898	\$37,558	1,008,663
TOTAL AVIATION			
Total Commercial Aviation	\$911,210	\$258,471	10,257,337
Total General Aviation	<u>64,456</u>	<u>19,916</u>	<u>637,758</u>
Total Aviation	\$975,666	\$278,387	10,895,095

(a) Includes "multiplier" effect

Aviation Means Jobs

The airlines in 1998 employed over 621,000 U.S. residents (excluding the multiplier effect of these jobs), including pilots, flight attendants, reservations and ticketing personnel, mechanics, etc. Several hundred thousand people also owe their jobs to airports, aircraft manufacturing firms, the travel agencies and other sectors of the aviation and aviation-support industries.

In addition to these jobs in the aviation industry and in industries that sell goods and services to the aviation industry, there are also jobs at restaurants and hotels that serve air passengers, and there are jobs that sell goods and services to the workers in the aviation industry.

Adding all these together, 10.9 million U.S. jobs are estimated to be attributable to aviation, either in the aviation industry or directly or indirectly serving that industry, as listed on Exhibit 6.

Exhibit 6 JOBS ATTRIBUTABLE TO AVIATION(a) 1998

	<u>Jobs</u>
Commercial Aviation:	
Provision	2,733,603
Use	<u>6,691,991</u>
Subtotal	9,425,594
General Aviation:	
Provision	298,144
Use	<u>162,694</u>
Subtotal	460,838
Aircraft Manufacturing	
Commercial	831,743
General Aviation	<u>176,920</u>
Subtotal	1,008,663
Total Aviation	10,895,095

(a) Includes multiplier effect.

Aviation's Contribution to GDP

The nation's Gross Domestic Product in 1998 was \$8,511.0 billion. If one were to look at the National Accounts, the Accounts would imply that aviation's share of GDP is less than 1.0%. That, however, is misleading because it excludes aircraft manufacturing, aviation use and many other aviation features.

To compare aviation's impact to that of GDP, an impact measure must only include the value added components. The earnings impact measure in the RIMS-II model is the impact measure that includes only the value added components.

The RIMS-II input/output model earnings impact comprises the wages and salaries, other labor income and proprietor's income components of total personal income as reported in the National Accounts. Analysis of the National Accounts indicates that the wages and salaries, other labor income and proprietors' income amounts to 69 percent of total GDP.

To estimate aviation's total contribution to GDP, this same 69 percent was applied to total earnings. This yields the estimated total value added impact of aviation on the U.S. economy. Aviation's value added impact is compared with the total U.S. GDP on Exhibit 7.

Exhibit 7 AVIATION'S 1998 CONTRIBUTION TO GDP

	<u>\$ Billion</u>	<u>Percent</u>
Gross Domestic Product	\$8,511.0	100.0%
Aviation Earnings		
Adjusted ^(a)	\$402.3	4.7%

(a) Total aviation earnings impacts, adjusted to be comparable with National Accounts.

Aviation's contribution to GDP is 4.7%, which includes aviation provision, use, and induced impacts but excludes the benefits accruing to American business from the ability to use aviation.

Air Passengers Are Important

Air travelers are important to local economies, whether they are conducting business, or are tourists. Entire sub-region economies have been created throughout the U.S. to serve air passengers.

Detailed studies have been conducted at dozens of U.S. airports to determine the per visitor dollar value attributable to people who arrive/depart by air. These expenditure rates vary by trip purpose, length of stay and countless other factors, and average \$272 per enplaned commercial passenger (including connecting passengers and excluding the price of the air ticket).

This study estimates that air passengers spent \$182.4 billion in 1998 in local economies (\$179.6 billion by commercial aviation passengers, \$2.8 billion by general aviation passengers).

Everyone Benefits from Aviation

Aviation benefits everyone, whether they have ever flown or not. If there were no air transportation or if there were major air system capacity restrictions, major and fundamental changes would have to be made in the way our economy operates. Such impacts, however, are not included in this study. Rather, the only impacts included herein are those directly involved in the provision or use of aviation, plus the impacts associated with responding and/or supplier industries.

Even industry types that are seemingly unrelated to aviation nevertheless benefit because they provide goods and services, directly or indirectly, to the aviation industry or because they serve the air passengers directly or indirectly, or because they benefit from the responding of money.

Exhibit 8 presents civil aviation's total economic impacts, by impacted sector of the economy, in 1998.

Exhibit 8 AVIATION IMPACTS BY INDUSTRY TYPE 1998

Industry Groups	Annual Economic Activity (\$million)	Annual Earnings (\$million)	Jobs
Agriculture	\$15,334	\$3,835	266,782
Const., Maint. & Repair	31,477	10,975	354,936
Food	34,979	4,117	135,838
Textiles	3,302	631	24,355
Apparel	3,672	853	43,189
Paper Products	9,247	1,610	39,647
Printing, Publishing	14,494	4,270	125,680
Chemicals, Petroleum	32,088	3,614	53,890
Rubber, Leather	7,600	1,675	53,138
Lumber, Furniture	4,498	989	40,325
Stone, Clay, Glass	3,464	879	24,938
Primary Metals	7,710	1,553	34,222
Fabricated Metals	7,963	2,011	57,441
Non-electrical Machinery	6,244	1,972	49,483
Electrical Machinery	6,623	1,642	40,199
Motor Vehicles,	7,598	1,151	23,170
Transportation Equip.	55,234	15,261	265,183
Instruments	4,340	1,254	24,616
Miscellaneous Mfg.	2,092	510	20,715
Transportation	136,161	42,050	1,307,875
Communications	19,656	4,257	80,243
Utilities	22,370	2,970	44,550
Wholesale Trade	34,322	11,665	306,218
Retail Trade	60,096	22,566	1,347,407
Finance	32,088	9,809	253,151
Insurance	14,136	5,082	136,733
Real Estate	66,952	3,276	202,566
Lodging, Amusements	80,311	25,599	1,522,057
Personal Services	5,603	2,330	163,143
Business Services	87,716	41,001	1,250,935
Eating, Drinking Estab.	52,498	16,638	1,455,902
Health Services	35,526	17,567	517,777
Other Services	70,273	14,779	628,791
TOTALS	\$975,666	\$278,387	10,895,095

Such sectors as transportation, lodging, real estate, oil retail trade benefit the most, but the statistics suggest that all sectors benefit – agriculture, textiles, utilities, health, etc.

ECONOMIC IMPACT OF COMMERCIAL AVIATION

"Commercial Aviation," as defined in this study, includes airline and air commuter services, air cargo, expenditures by passengers using the airlines, the travel agency industry, U.S. commercial service airports and other activities associated with the provision and use of airports and aviation services. It excludes air taxi and other forms of general aviation.

The Commercial Aviation Industry

The commercial aviation industry in the U.S. includes: 402 airports with scheduled airline service and another 145 with unscheduled service; over 60 air carriers; over 20 all-cargo air carriers; over 100 regional/commuter airlines; 660 million annual passenger enplanements; over 32,700 travel agency locations, and over 12,800 satellite ticket printers; plus countless hotels, rental car agencies and other firms which serve air passengers.

Commercial aviation, already a major U.S. industry, is becoming increasingly more significant as more and more people choose to travel by air, as shown on Exhibit 9. As aviation use increases, so does its value to the U.S. economy. Passenger use of America's largest airports is shown on Exhibit 10.

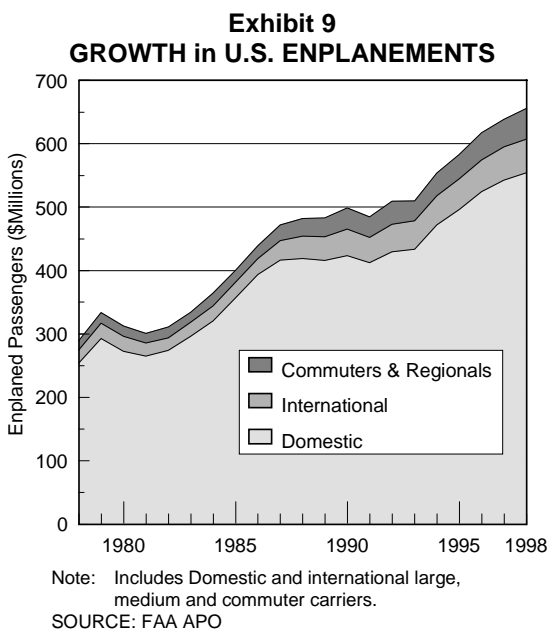


Exhibit 10 USE OF MAJOR U.S. AIRPORTS - 1998^(a)

Airport	Total Passengers
Atlanta	73,474,298
Chicago O'Hare	72,485,228
Los Angeles	61,215,712
Dallas/Ft. Worth	60,482,700
San Francisco	40,060,326
Denver	36,831,400
Miami	33,935,491
Newark	32,512,106
Phoenix	31,769,113
Detroit	31,544,426
New York Kennedy	31,436,478
Houston International	31,026,369
Minneapolis/St. Paul	30,347,920
Las Vegas	30,227,287
St. Louis	28,700,622
Orlando	27,748,571
Boston	26,526,708
Seattle	25,863,132
Philadelphia	24,230,374
Charlotte	22,951,636
New York LaGuardia	22,846,488
Honolulu	22,636,354
Cincinnati	21,179,209
Pittsburgh	20,556,075
Salt Lake City	20,297,371
Washington National	15,808,879
Washington Dulles	15,619,407
Baltimore/Washington	15,003,819
San Diego	14,876,877
Tampa	13,830,991
Portland	13,019,366
Fort Lauderdale/Hollywood	12,453,874
Cleveland	12,358,674
Chicago Midway	11,419,528
Kansas City	10,954,527
San Jose	10,506,278
Memphis	10,063,883
Oakland	9,616,241
San Juan	9,315,185
New Orleans	8,952,484
Houston Hobby	8,750,346
Nashville	8,026,363
Santa Ana	7,459,598
Raleigh/Durham	7,336,424
Indianapolis	7,292,132
Sacramento	7,201,378
San Antonio	7,016,908
Reno	6,782,468
Dallas	6,715,596
Ontario	6,434,858
Columbus	6,420,037
Albuquerque	6,149,197
Austin	6,065,973
West Palm Beach	5,899,482
Kahului	5,840,417
Hartford/Springfield	5,636,541
Milwaukee	5,535,921
Anchorage	5,016,489
Burbank/Glendale/Pasadena	4,731,656
Fort Myers	4,670,733
Jacksonville	4,662,361

(a) U.S. and foreign flag airline enplanements and deplanements. Excludes air taxi and other general aviation.
SOURCE: AOCI

Commercial Aviation's Economic Impact

In 1998, air passengers spent over \$83 billion on air tickets; another \$20 billion was spent on air freight and other air cargo. These expenditures represent only a small portion of the total impact which commercial aviation has on the U.S. economy. The availability of air transportation also encourages other economic activity -- everything from amusement parks and conventions to centralized corporate headquarters, and includes expenditures and induced economic impacts throughout the U.S.

To estimate commercial aviation's impact, this study included every commercial service airport. Impacts include expenditures by airlines, air cargo firms, passengers and others. Care was taken to reduce the effects of double counting of impacts.

The economic value of commercial aviation, including its "multiplier" effect, can be seen on Exhibit 11 and in these findings.

- # Commercial aviation-related economic activity totals \$911.2 billion annually, including 10.3 million employees who earn \$258.5 billion annually.
- # Of the total commercial impacts, 32% are due to the provision of aviation, 11% to manufacture of aircraft, and 57% to the use of aviation.
- # The airlines generate 82% of the direct impacts with commercial aviation.
- # The commercial aviation direct/indirect economic impacts are \$318.0 billion, and the induced impacts are \$593.2 billion.
- # For each dollar delivered to final demand an additional \$1.87 in economic activity (out-put) is generated, for an overall commercial aviation economic activity multiplier of 2.87.
- # Expenditures by air travelers (excluding the cost of their air tickets), comprise 55% of the total impacts, indicating that visitors (tourists and business travelers) are extremely important to local economies.
- # Overall, "commercial aviation's" impact is estimated to comprise 93.4% of aviation's total impact (general aviation comprises the remainder).

Exhibit 11 ANNUAL 1998 ECONOMIC IMPACT OF COMMERCIAL AVIATION^(a)

	<u>Annual Economic Activity</u> (\$ Billion)	<u>Annual Earnings</u> (\$ Billion)	<u>Jobs</u>
Impacts of Commercial Aviation Provision:			
Certificated Airlines	\$243.1	\$69.0	2,278,758
Airports and Other	45.4	13.5	454,845
Subtotal	\$288.5	\$82.5	2,733,603
Impacts of Commercial Aviation Use:			
Passenger Expenditures(b)	\$502.2	\$139.8	6,489,169
Travel Arrangements	15.9	5.2	202,822
Subtotal	\$518.1	\$145.0	6,691,991
Commercial Aviation Manufacturing	104.6	31.0	831,743
Total Commercial Aviation Impacts	\$911.2	\$258.5	10,257,337

(a) Includes "multiplier" effect

(b) Excludes air ticket

ECONOMIC IMPORTANCE OF GENERAL AVIATION

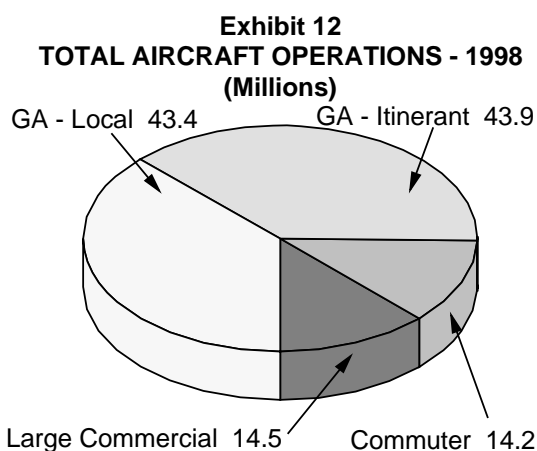
"General Aviation," as defined in this study, includes air taxi, business, corporate and private aviation, and helicopters. General aviation use of both general aviation and commercial service airports is included; airlines and air cargo services are not. The "General Aviation" impact estimates include impacts associated with airport and aircraft use, passenger services, visitor expenditures, fixed base operators (FBO's), flight schools, business aviation and all of the services provided to and by general aviation.

The General Aviation Industry

General aviation is a major U.S. industry and its service is vital to the American economy. The U.S. business community is heavily dependent upon general aviation, with many important U.S. firms owning and using general aviation aircraft.

According to such statistics as those on Exhibits 12 and 13, general aviation dominates the aviation industry. For example, while there are 547 airports with commercial service certificates (also used by general aviation), there are 18,199 exclusively general aviation airports. General aviation also dominates in terms of number of active aircraft (194,825 aircraft) and total annual aircraft operations (over 87 million in 1998).

While general aviation aircraft tend to be small in size, the impacts on the nation's economy are substantial, due to the large volume of general aviation activity.



Note: Includes operations at towered and non-towered airports.

Source: FAA APO

Exhibit 13 U.S. GENERAL AVIATION CHARACTERISTICS

	<u>Number</u>	<u>Percent</u>
Airports (1998)		
Certified for		
Commercial Service	547	2.9
Only General Aviation:		
Public Use	5,356	28.6
Private Use	<u>7,591</u>	<u>40.5</u>
Subtotal	12,947	69.1
Other Use:		
Seaplane	445	2.4
Heliport/Stolport	<u>4,807</u>	<u>25.6</u>
Subtotal	<u>5,252</u>	<u>28.0</u>
Total U.S. Airports	18,746	100.0
Airport Ownership:		
Publicly Owned	5,148	27.5
Privately Owned	<u>13,598</u>	<u>72.5</u>
	18,746	100.0
Active Aircraft (1998)		
Fixed Wing:		
Piston	157,783	81.0
Turbo Prop	5,700	2.9
Turbo Jet	<u>5,468</u>	<u>2.8</u>
Subtotal	168,951	86.7
Helicopter	6,848	3.5
Other	4,126	2.1
Experimental ^(a)	<u>14,900</u>	<u>7.7</u>
Total General	25,874	13.3
Aviation Aircraft	194,825	100.0

Aircraft Operations (1998)^(b)		
Commercial	28,638,294	24.7
General Aviation	<u>87,382,437</u>	<u>75.3</u>
Total Aircraft		
Operations	116,020,731	100.0

Active Pilots (1998)		
Student	97,736	15.8
Private	247,226	40.0
Other	<u>273,336</u>	<u>44.2</u>
Total Pilots	618,298	100.0

Source: FAA statistical Handbook and APO-110.

(a) Recently added FAA classification.

(b) Towered and non-towered airports.

General Aviation's Economic Impact

The principal importance of general aviation is the service that it provides to America's business community in the form of on-the-spot efficient and direct transportation. Such benefits, however, are not included in this impact study. Rather, only those financial transactions and jobs that can be traced to general aviation are included in the impact estimates.

The impacts comprise the jobs and expenditures involved in supplying general aviation services (the FBO's, flight schools, etc.), the pilots and corporate aviation departments, the expenditures by the general aviation pilots and passengers, the firms that indirectly support the industry, and the respending of money in local economies.

Exhibit 14 suggests that:

- # General aviation-related economic activity totals \$64.5 billion annually.
- # General aviation and related activity employs nearly 638,000 people who earn \$19.9 billion.

- # Approximately 34% of the general aviation impact is due to aircraft manufacturing.
- # Excluding aircraft manufacturing, 73% of the general aviation impacts are attributable to the direct impacts of aviation provision, and 27% are due to general aviation use.
- # The general aviation direct/indirect economic impacts are \$21.7 billion, and the induced impacts are \$42.8 billion.
- # For each dollar delivered to final demand an additional \$1.97 in economic activity (output) is generated, for an overall general aviation economic activity output multiplier of 2.97.
- # Overall, general aviation's impact is estimated to comprise 6.6% of aviation's total impact (commercial aviation comprises the remainder).

Exhibit 14
ANNUAL 1998 ECONOMIC IMPACT OF GENERAL AVIATION^(a)

	Annual Economic Activity (\$ Billion)	Annual Earnings (\$ Billion)	<u>Jobs</u>
Impacts of General Aviation Provision:			
At Commercial Services Airports	\$12.9	\$3.8	125,215
At General Aviation Airports	<u>17.8</u>	<u>5.1</u>	<u>172,929</u>
Subtotal	\$30.7	\$8.9	298,144
Impacts of General Aviation Use:			
Passenger Expenditures	\$7.8	\$2.2	100,819
Business Aviation, Other	<u>3.7</u>	<u>2.3</u>	<u>61,875</u>
Subtotal	\$11.5	\$4.5	162,694
General Aviation Manufacturing	<u>22.3</u>	<u>6.5</u>	<u>176,920</u>
Total General Aviation Impacts	\$64.5	\$19.9	637,758

(a) Includes "multiplier" effect.

AIRCRAFT MANUFACTURING ECONOMIC IMPACT

The U.S. aircraft manufacturing industry is a source of pride and economic prosperity for many Americans. In 1998 the civil aircraft industry comprised 19 aircraft assembly firms and over 10,000 other firms that build engines, subassemblies, components and parts. All of these activities are included in this study's economic impact estimates.

In 1998 the U.S. aircraft industry shipped 3,142 complete new aircraft, as listed on Exhibit 15.

Exhibit 15
COMPLETE CIVIL AIRCRAFT SHIPPED
1998

<u>Aircraft Company</u>	<u>Number</u>
Commercial Aircraft:	
Boeing Commercial Airplanes	505
Douglas Aircraft Co.	<u>54</u>
Subtotal	559
Civil Helicopters:	
Brantley	2
Enstrom Helicopter Corp.	14
Kaman	2
McDonnell-Douglas Corp.	37
Robinson Helicopter Co.	251
Schweizer Aircraft Corp.	41
Sikorsky Aircraft	<u>16</u>
Subtotal	363
General Aviation:	
American Champion	74
Aviat	85
Boeing Business Jets	7
Bellanca	1
Cessna Aircraft	1,072
Commander Aircraft	13
Gulfstream Aerospace Corp.	61
Learjet Corp.	61
Maule Air, Inc.	63
Mooney Aircraft Corp.	93
Raytheon Aircraft	395
The New Piper Aircraft Corp.	<u>295</u>
Subtotal	<u>2,210</u>
Total Aircraft Shipped	3,142

Source: Aerospace Facts & Figures, AIA

The Aircraft Industry's Economic Impact

The aircraft industry impacts the U.S. economy in many ways. Air frame production employs over 114,800 people who, in turn, pay taxes and make purchases. In addition, the 10,000+ firms that sell parts and services to the assembly firms also employ many thousands of people and make countless other purchases. Many aircraft and parts are sold overseas, thereby helping the U.S. balance of payments, and many "high-tech" aircraft innovations are subsequently used to benefit other U.S. industries.

To accurately assess the total aircraft manufacturing industry, this National Study included every aircraft assembly company, plus the major parts firms. The industry in 1998 had net non-military sales of \$41.4 billion (\$36.5 billion commercial aircraft, \$0.3 billion helicopter, and \$5.6 billion general aviation aircraft.) By tracing these funds through the nation's economy, the study found that the aircraft industry's impact in 1998 was:

- # \$126.9 billion in annual economic activity
- # \$37.6 billion annual earnings
- # Over 1.0 million U.S. jobs

While the commercial aircraft sector (principally Boeing and Douglas) dominates the industry, the general aviation aircraft manufacturers are also extremely important to the nation's economy, as shown on Exhibit 16.

Exhibit 16
1998 AIRCRAFT MANUFACTURING
IMPACTS^(a)

<u>Aircraft Type</u>	<u>Economic Activity</u> (\$Billion)	<u>Earnings</u> (\$Billion)	<u>Jobs</u>
Commercial ^(b)	\$104.6	\$31.0	831,743
General Aviation ^(c)	<u>22.3</u>	<u>6.6</u>	<u>176,920</u>
Total	\$126.9	\$37.6	1,008,663

(a) Includes multiplier effect.

(b) Large aircraft, principally Boeing and Douglas.

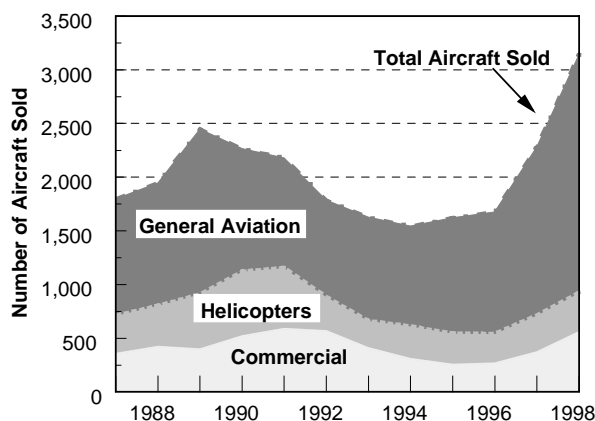
(c) All other civil aircraft including helicopters.

AVIATION ECONOMIC IMPACT GROWTH – 1987 TO 1998

General aviation aircraft operations, active non-commercial pilots and registered aircraft experienced a slow but steady decline between 1987 and 1993 but has since improved. Similarly, the economic activity impacts associated with general aviation declined in real terms between 1987 and 1993 before increasing by 1998.

Conversely, aircraft manufacturing sales fluctuated up and down. The turbulent rise and fall was led by sales of commercial aircraft. In 1987, 357 commercial aircraft were sold; this rose to 589 (1991), fell to 408 (1993) and rose again to 559 (1998). As shown in Exhibit 17, both helicopters and general aviation aircraft sales demonstrated similar fluctuations.

Exhibit 17
AIRCRAFT SOLD by TYPE - 1987 to 1998



SOURCE: Aerospace Industries Association

Total Economic Activity Impact

The economic impact of civil aviation has increased in real terms since the first study evaluated the 1987 impacts. The consumer price index for all consumer goods developed by the U.S. Department of Commerce was used to convert the economic impacts of commercial aviation, general aviation and civil aircraft manufacturing for the years 1987, 1989, 1991, 1993 and 1998 into constant 1998 dollars. The total constant dollar economic activity impacts between 1987 and 1998 rose 31.1 percent from \$744.2 billion to 975.7 billion as shown below in Exhibit 18.

The three major areas of impact experienced different market forces over the analysis period. Commercial aviation impacts increased at a constant and moderate rate, general aviation impacts declined slightly and then increased, and aircraft manufacturing impacts increased tremendously before leveling off.

During the 1987 to 1998 period total commercial passenger enplanements rose 41.3 percent from 467 million to 660 million. This resulted in more airline employees and more aviation visitors. This led to a similar 29.5 percent constant dollar increase in estimated commercial economic activity impacts from \$622.7 billion in 1987 to \$806.6 billion in 1998.

Exhibit 18
TOTAL ECONOMIC ACTIVITY IMPACT OF CIVIL AVIATION
Constant \$1998

	<u>1987</u>	<u>ANNUAL ECONOMIC ACTIVITY (\$Millions)</u>				<u>Change</u> <u>1987-98</u>
		<u>1989</u>	<u>1991</u>	<u>1993</u>	<u>1998</u>	
Commercial	\$622,734	\$667,167	\$682,355	\$726,213	\$806,570	29.5%
General Aviation	41,822	41,583	40,345	40,109	42,199	0.9%
Manufacturing	<u>79,627</u>	<u>94,906</u>	<u>138,546</u>	<u>124,965</u>	<u>126,898</u>	59.4%
Total	\$744,183	\$803,656	\$861,246	\$891,287	\$975,667	31.1%

Total Job and Earning Impact Changes

In addition to the change in annual economic activity, the jobs and earnings impacts associated with civil aviation also changed during the 1987 to 1998 study period. Total jobs increased 35.2 percent from 8.0 million to 10.9 million as shown in Exhibit 19. This was led by the steady increase in commercial passenger enplanements and the strong increase in civil aircraft manufacturing. Similarly, the total earnings associated with these jobs, in constant 1998 dollars, also rose from \$219.9 billion to \$278.4 billion.

Exhibit 19
TOTAL CHANGE IN JOB IMPACTS
1987 to 1998

	<u>Jobs (000's)</u>		<u>Percent</u>
	<u>1987</u>	<u>1998</u>	<u>Change</u>
Commercial	6,946	9,426	35.7%
General Aviation	429	460	7.2%
Aircraft Manufact.	<u>680</u>	<u>1,008</u>	<u>48.2%</u>
	8,056	10,895	35.2%

Continuing Growth in Economic Impact

This study finds that the economic impact value of civil aviation continues to increase, even when aircraft manufacturing, or general aviation activity decline, or, airlines' experience financial difficulties. This is because aviation use continues to increase. Enplanements rose from 467 million in 1987 to 650 million in 1998, while air cargo revenue-ton-miles (RTM) rose from 5.8 billion (1987) to 11.7 billion (1998).

Detailed Impact Changes

The detailed economic activity impacts for the analysis years of 1987, 1989, 1991, 1993 and 1998 are presented in Exhibit 20. These data for the five years are presented in constant 1998 dollars.

Exhibit 20
ECONOMIC ACTIVITY IMPACTS - 1987 to 1998
Constant \$1998

	ANNUAL ECONOMIC ACTIVITY (\$Millions) ^a					Change
	1987	1989	1991	1993	1998	1987-98
COMMERCIAL SERVICE AIRPORTS						
Direct Impacts						
Commercial Aviation						
Certified Airlines ^b	\$179,525	\$207,147	\$213,128	\$217,491	\$243,066	35.4%
Airports & Other	40,320	41,296	41,173	43,229	45,411	12.6%
General Aviation	12,672	12,167	11,520	11,869	12,921	2.0%
Total Direct	\$232,517	\$260,610	\$265,821	\$272,589	\$301,398	29.6%
Indirect Impacts						
Visitor Expenditures						
Air Carrier/Commuter	\$387,041	\$402,674	\$412,121	\$446,955	\$502,185	29.7%
General Aviation	5,726	5,954	5,982	5,782	5,608	-2.1%
Total Visitor Expend.	\$392,767	\$408,628	\$418,103	\$452,737	\$507,793	29.3%
Travel Arrangements	15,848	16,050	15,933	18,538	15,908	0.4%
Other General Aviation Indirect	1,823	1,895	1,904	1,840	1,811	-0.7%
Total Indirect	\$410,438	\$426,573	\$435,940	\$473,115	\$525,512	28.0%
Total Commercial Service	\$642,955	\$687,183	\$701,761	\$745,704	\$826,910	28.6%
GENERAL AVIATION AIRPORTS						
Direct Impacts	\$417,423	\$17,370	\$16,843	\$16,381	\$17,840	2.4%
Indirect Impacts						
Visitor Expend.	2,210	2,209	2,162	2,240	2,130	-3.6%
Other Indirect	1,968	1,988	1,934	1,997	1,889	-4.0%
Total Indirect	4,178	4,197	4,096	4,237	4,019	-3.8%
Total General Aviation	\$21,601	\$21,567	\$20,939	\$20,618	\$21,859	1.2%
AIRCRAFT/PARTS MANUFACTURE						
Commercial Aircraft/New Parts	\$675,87	\$482,140	\$125,574	\$112,330	\$104,640	54.8%
General Aviation Aircraft/Parts	12,040	12,766	12,972	12,635	22,258	84.9%
Total Aircraft/Parts	\$79,627	\$94,906	\$138,546	\$124,965	\$126,898	59.4%
TOTAL AVIATION						
Total Commercial Aviation (incl. mfg)	\$690,321	\$749,307	\$807,929	\$838,543	\$911,210	32.0%
Total General Aviation (incl. mfg)	53,862	54,349	53,317	52,744	64,457	19.7%
Total Aviation	\$744,183	\$803,656	\$861,246	\$891,287	\$975,667	31.1%

a Includes multiplier

b Adjusted from earlier reports

NOTE: The numbers on this Exhibit 20 are expressed in constant 1998 price levels. The 1987, 1989, 1991 and 1993 numbers are therefore different than those shown in the previous reports. The previous reports expressed the impacts at constant price levels reflective of 1987, 1989, 1991 or 1993 price levels.

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NOTE

This presentation comprises the year 2000 update of a series of aviation economic impact studies conducted by Wilbur Smith Associates. This year's update was conducted for the Federal Aviation Administration and MCA Research Corporation, by Wilbur Smith Associates and Applied Management Solutions, Inc.



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